

## **PATIENTS AND METHODS**

This study included 40 patients (18 males and 22 females) with the age range from 4-65 years who were presented clinically with different hip joint complaint and referred from orthopedic surgery, pediatric, rheumatology, out-patient clinics and emergency hospital at Tanta university hospital to radiodiagnosis and medical imaging department for MR examination of the hip for diagnosis and evaluation. This study was performed at the period between April 2015 to august 2016.

### **Inclusion Criteria:**

- Patients complaining of acute and chronic hip joint pain.

### **Exclusion Criteria:**

- Patients having a heart pacemaker.
- Patients having a metallic foreign bodies or who have an aneurysm clip in their brain, cannot have MRI scan since the magnetic field may dislodge the

metal.

- Patients with severe claustrophobia may not be able to tolerate an MRI scan, although more open scanners are now available, and medical sedation is available to make the test easier to tolerate.
- Patients who have referred pain in their hip joint.
- Known patients of hip joint malignancy.

### **All the patients were subjected to the following:**

- 1- Detailed history taking, including patient's age, onset, course and duration of hip pain, family history of any systemic disease and past history of hip trauma or any hip joint surgery.
- 2- Local examination of the diseased hip were performed to detect external signs like swelling or inflammation, detection of areas of tenderness and evaluation of hip joint movement.
- 3- Laboratory investigations including complete blood cell counts, C reactive protein, erythrocyte sedimentation rate, serological tests for rheumatoid factor and the cultures of the aspirated fluids in patient's with infective arthritis (data were taken from the patients' files).

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- 4- Conventional radiography of both hips were performed for all the patients mostly in antero-posterior to detect fractures, dislocations, bony lesions, or soft tissue swelling..
- 5- MRI examinations of both hips were performed for all the patients using a 1.5 Tesla MRI machine scanner.
- 6- Ultrasonography of the affected hip was performed for 6 patients.

**Patient preparation:**

Before entering the examination room, the patient was informed about the nature of the examination and the general rules that must be performed during the study period that include:

- Removing anything containing metal.
- The time duration of the examination.
- Knocking sound which is usually heard during scanning.
- Calm breath during the examination.
- No motion throughout the examination.

**Protocol of the MRI study:**

Patients were typically positioned supine on the examination table. The feet were internally rotated and gently immobilized with tape if necessary and slight flexion at the knees.

Both hips were examined for suspected bilateral abnormalities using the body coil with a large field of view to determine the extent of the lesions and to allow for comparison between the normal and abnormal sides. The slice thicknesses were adjusted to be 4-8mm and thinner slices were

used when more details were required.

**Images were taken in the following sequences:**

- 1- Scout view of the hip: coronal T1 WI image was performed for all cases for localization of subsequent slices of different planes and delineate the anatomy.
- 2- Coronal T1 and T2 weighted images.
- 3- Axial T1 and T2 weighted images.
- 4- Sagittal T1 & T2 weighted images
- 5- Coronal STIR (short time inversion recovery) weighted images
- 6- In selective cases; Post contrast T1 weighted images in sagittal, axial and coronal planes were performed immediately after intravenous bolus injection of Gadolinium DTPA in dose of 0.1mmoll/kg. in 7 patients, who were clinically and radiologically suspected to have infective arthritis.

The examinations were recorded on compact discs (CDs) that were meticulously revised to detect and assess any abnormalities that would justify the patients' complaint.

Interpretation was done regarding assessment

of the followings:

- Hip joint alignment on both sides to determine femoral head acetabular articulation and exclude femoral head dislocation
- Femoral heads regarding size, shape and the signal intensity. Femoral head marrow signal intensity was estimated in both T1&T2WIs and graded as normal, increased or decreased (judged relative to the contralateral femoral head in unilateral disease or to the subcutaneous fat and greater trochanteric epiphysis in bilateral diseases). The femoral epiphysis is divided into three-compartment (medial, lateral and central) for localization of the abnormal signals.
- The joint space for presence or absence of joint effusion and is graded into mild, moderate and severe, and for the presence of any intra-articular loose bodies.
- The joint synovium to determine the degree of synovial thickening and the degree of enhancement after contrast study or any abnormal signal in the synovium in all pulse sequences.
- The pelvic bones and the upper femur, for exclusion of any bone fractures, tumors and infection and

assess the signal intensity of the bone marrow and evaluate any abnormal signal in all pulse sequences.

- The periarticular soft tissues for any abnormal signal or any abnormal swelling.
- The surrounding muscles and intrapelvic soft tissue structures for the presence of any abnormal signal for exclusion of muscle tear or strain or other inflammatory or neoplastic lesions.
- The findings obtained by MRI were recorded and compared with the final diagnosis achieved by surgical data in 7 patients (core decompression & total hip arthroplasty), culture and sensitivity of the aspirated joint effusion in 5 patients, histopathology in 5 patients and follow up by clinical, laboratory and other imaging studies in 23 patients.
- The sensitivity of the MRI in diagnosis of the different hip joint pathologies was calculated according to the following formula:

$$\text{Sensitivity} = \frac{\text{True positive}}{\text{True positive} + \text{false negative}} \times 100$$